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EXAMINER	
DATSKOVSKIY, MICHAEL V	
ART UNIT	PAPER NUMBER
2835	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/26/2006	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	**Application No.** 10/683,924	**Applicant(s)** SAUCIUC ET AL.	
	Examiner Michael V. Datskovskiy	**Art Unit** 2835	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 10 November 2006.
2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 4-8 and 21-25 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) 4-8 and 21-25 is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☒ The drawing(s) filed on 10 October 2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a)☐ All b)☐ Some * c)☐ None of:
1.☐ Certified copies of the priority documents have been received.
2.☐ Certified copies of the priority documents have been received in Application No. _____.
3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 11/13/2006 have been fully considered but they are not persuasive. First: Examiner strongly disagrees with the applicant's statement that: "Meir does not state that that power to the TEC 228 is limited and that the fan speed is accelerated. Claim 21 thus includes at least one limitation that is not suggested by Meir". On the contrary: Meir in paragraphs [0052] and [0056] discloses: "Optionally, the method further comprises the steps of sampling data from the processor temperature sensor; determining whether the sampled data is within a preselected acceptable range, and if said data is higher than the preselected range, setting a PWM signal output from the microprocessor to maximum (about 100% PWM) to operate the thermoelectric element(s) at maximum power; and operating the processor cooling fan at maximum speed for maximum cooling of the processor". Second: Applicant's arguments with respect to claim 24 have been considered but are moot in view of the new ground(s) of rejection. Originally, in claim 24 applicants claimed controlling the current based on an input from at least one of the sensors, thereby assuming the possibility of a TEC control system based on a feedback from any quantity of these sensors in different combinations. In the specification, besides a general block-diagram of the device, applicant has not provided any specific circuit layouts of any particular combination of these sensors. Applicant's statement that: "Examiner has cited various pieces of art, each one disclosing one or two of the features from (i) to (iv). However, no single piece of art teaches or suggests the use of all four feedback systems as claimed as such

claim 24 includes as least one limitation that is not suggested by any of the references, alone or in combination" does not include any specific arguments against a possibility of a combination of such feedback systems in one, comprising all of them.

Therefore, examiner considers as appropriate the rejection of claims 24-25 under 35 USC § 103 over the combination of the known prior art references comprising different feedback sensors.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 21 and 8 are rejected under 35 U.S.C. 102(e) as being anticipated by Meir (US Patent Application Publication 2005/0174737 A1).

: Meir teaches a computer system, Fig. 5, comprising: a microelectronic die 319 having an integrated circuit formed therein; a thermoelectric module 318 thermally coupled to the microelectronic die 319 so as to pump heat from the microelectronic die when current is provided to the thermoelectric module 318; a cold side plate 317; a hot side plate (heat sink) 315; a cold-side temperature sensor 320 at one side of the thermoelectric module; and a controller 322 connected to the temperature sensor 320 to receive an indication of temperature at the temperature sensor 320 as an input into the controller 322, the controller 322 controlling the current provided to the thermoelectric module based on the input. Meir teaches furthermore the computer system of claim 1, further comprising: an ambient temperature sensor 324 detecting ambient temperature of air distant from the microelectronic die 319 and the thermoelectric module 318, the controller being connected to the ambient temperature sensor 324 to receive an indication of temperature at the ambient temperature sensor 324, the controller 322 controlling current provided to the thermoelectric module 318 based on an input from the ambient temperature sensor 324. Meir teaches furthermore the computer system further comprising: a fan 314 inherently provided with a motor coupled to the fan to rotate the fan so that the fan cools the microelectronic die 319 when power is provided to the motor, the controller controlling power provided to the motor such that power to the thermoelectric module is limited and fan speed is accelerated when power to the thermoelectric module reaches a predetermined maximum value (paragraphs [0052]; and [0056]).

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 24 and 25, as dependent on claim 24, are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is not clear how it is possible to operate an integrated circuit in a microelectronic die so that the microelectronic die generates heat; by providing current to a thermoelectric module so that the thermoelectric module pumps the heat from the microelectronic die; and controlling the current based on an input from a plurality of feedback input sensors and the same current provided to the thermoelectric module.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 22, 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meir in view of Atkinson (US Patent Application Publication 2005/0204747 A1).

Meir teaches all the limitations of the claims except the computer system of claim 1, further comprising: a vapor chamber between the microelectronic die and the thermoelectric module; and a fluid in the vapor chamber, the fluid being evaporated when heat transfers thereto from the microelectronic die and condensing when heat transfers therefrom to the thermoelectric module. Atkinson teaches a thermoelectrically cooling electronic device 10, Fig. 6, comprising an a heat generating electronic component 44; a thermoelectric module 14; a hot side heat sink 12 mounted on a top of the heat sink 12; and a vapor chamber 16 between the electronic component 44 and the thermoelectric module 14; and a fluid in the vapor chamber, the fluid being evaporated when heat transfers thereto from the microelectronic die and condensing when heat transfers therefrom to the thermoelectric module (see paragraph [0013]). It would have been obvious to one having ordinary skill in the art at the time invention was made to employ a vapor chamber between the microelectronic die and the thermoelectric module, as it is disclosed by Atkinson, in the device by Meir, in order to enhance heat dissipation from the heat generating microelectronic die.

8. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Meir as applied to claim 21 above, and further in view of Watanabe (US Patent 6,817,191). Meir teaches all the limitations of the claims except the computer system of claim 2, further comprising: a hot plate thermally coupled to the thermoelectric module, with the thermoelectric module between the microelectronic die and the hot plate; and a hot-side temperature sensor on a side of the thermoelectric module of the hot plate and opposing the microelectronic chip, the controller being connected to the hot-side temperature sensor to receive an indication of temperature at the hot-side temperature sensor, the controller controlling current provided to the thermoelectric module based on an input from the hot-side temperature sensor. Watanabe teaches a thermoelectrically cooling electronic device, Figs. 1-2, comprising: a hot plate (heat sink) 3 thermally coupled to the thermoelectric module 2, with the thermoelectric module between a cooled component 1 and the hot plate 3; and a hot-side temperature sensor 4 on a side of the thermoelectric module of the hot plate 3 and opposing the cooled component 1, the controller being connected to the hot-side temperature sensor to receive an indication of temperature at the hot-side temperature sensor, the controller controlling current provided to the thermoelectric module based on an input from the hot-side

temperature sensor 4. It would have been obvious to one having ordinary skill in the art at the time invention was made to employ a hot-side temperature sensor on a side of the thermoelectric module of the hot plate and opposing the microelectronic chip, the controller being connected to the hot-side temperature sensor to receive an indication of temperature at the hot-side temperature sensor, the controller controlling current provided to the thermoelectric module based on an input from the hot-side temperature sensor, as Watanabe discloses it in the device by Meir, in order to diversify control of the thermoelectric module.

9. Claims 5, 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meir as applied to claim 21 above, and further in view of Richman (US Patent 4,685,081). Meir teaches all limitations of the claims except the computer system of claim 2, further comprising: a junction temperature sensor within the microelectronic die, the controller being connected to the junction temperature sensor to receive an indication of temperature at the junction temperature sensor, the controller controlling current provided to the thermoelectric module based on an input from the junction temperature sensor. Richman teaches a Peltier junction used for thermal control of solid-state devices comprising a junction temperature sensor 43 within the microelectronic die 21 (col. 3, lines 49-64), the controller 39 being connected to the junction temperature sensor to receive an indication of temperature at the junction temperature sensor, the controller controlling current provided to the thermoelectric module based on an input from the junction temperature sensor 43. It would have been obvious to one having ordinary skill in the art at the time invention was made to employ a junction temperature

sensor within the microelectronic die, the controller being connected to the junction temperature sensor to receive an indication of temperature at the junction temperature sensor, the controller controlling current provided to the thermoelectric module based on an input from the junction temperature sensor in the device by Meir, as Richman discloses it, in order to diversify control of the thermoelectric module.

10. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Meir in view Richman as applied to claim 6 above, and further in view of Palfy et al (US Patent 6,470,696).

Meir in view of Richman teach all limitations of the claim except the computer system of claim 6, further comprising: an ambient moisture sensor detecting ambient moisture of air distant from the microelectronic die and the thermoelectric module, the controller being connected to h the ambient moisture sensor to receive an indication of moisture at the ambient moisture sensor, the controller controlling current provided to the thermoelectric module based on an input from the ambient moisture sensor. Palfy et al teach a thermoelectric cooler for computer/electronic devices comprising an ambient moisture sensor 13 detecting ambient moisture of air distant from the thermoelectric module, the controller 20 being connected to h the ambient moisture sensor 13 to receive an indication of moisture at the ambient moisture sensor, the controller 20 controlling current provided to the thermoelectric module based on an input from the ambient moisture sensor (see Fig. 4). It would have been obvious to one having ordinary skill in the art at the time invention was made to employ an ambient moisture sensor detecting ambient moisture of air distant from the microelectronic die and the thermoelectric module, the controller being connected to h the ambient moisture sensor to receive an indication of moisture at the ambient moisture sensor, the controller controlling current provided to the thermoelectric module based on an input from the ambient moisture sensor in the device by Meir and Richman, as Palfy et al disclose it, in order to diversify control of the thermoelectric module.

11. Claim 24, as best understood by examiner, is rejected under 35 U.S.C. 103(a) as being unpatentable over Ochkovskii (SU682884) in view of DeVilbiss et al (US Patent 5,690,849).

Ochkovskii teaches a method, comprising: operating an integrated circuit in a microelectronic die so that the microelectronic die generates heat; providing current to a thermoelectric module so that the thermoelectric module pumps the heat from the microelectronic die; and controlling the current based on an input from the following: a cold-side temperature sensor between the microelectronic die and the thermoelectric module; a hot-side temperature sensor on a side of the thermoelectric module opposing the microelectronic die; and an ambient temperature sensor detecting ambient temperature of air distant from the microelectronic die and the thermoelectric module. Ochkovskii does not teach controlling the current based on an input from (a sensor of the) current provided to the thermoelectric module. DeVilbiss et al teach a method of current control of thermoelectric devices by providing current to a thermoelectric module so that the thermoelectric module pumps the heat from the cooled substance; and controlling the current based on an input from the following: a hot-side temperature sensor on a side of the thermoelectric module opposing the cooled substance; and an current sensor detecting a current provided to the thermoelectric module. It would have been obvious to one having ordinary skill in the art at the time invention was made to employ in the device by Ochkovskii the controller controlling current provided to the thermoelectric module based on an input from the current sensor as DeVilbiss et al disclose it, in order to facilitate the control of the thermoelectric module.

12. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ochkovskii in view of DeVilbiss et al as applied to claim 24 above, and further in view of Ishida et al (previously cited US Patent 6,173,576).

Ochkovskii in view of DeVilbiss et al teach all the limitations of the claim except said method of claim 24, further comprising: transferring the heat from the microelectronic die to a fluid in a vapor chamber so that the vapor evaporates; and transferring the heat from the fluid to the thermoelectric module so that the fluid condenses. Ishida et al teach a method, comprising: operating an integrated circuit 12 in a microelectronic die so that the microelectronic die generates heat; providing current to a thermoelectric module 18 so that the thermoelectric module pumps the heat from the microelectronic die 12; and controlling the current based on an input from the following: a cold-side temperature sensor 34 between the microelectronic die and the thermoelectric module; and transferring the heat from the microelectronic die to a fluid in a vapor chamber 42 so that the vapor evaporates; and transferring the heat from the fluid to the thermoelectric module so that the fluid condenses. It would have been obvious to one having ordinary skill in the art at the time invention was made to employ a vapor chamber between the microelectronic die and the thermoelectric module, as it is disclosed by DeVilbiss et al, in the device Ochkovskii, in order to enhance heat dissipation from the cooled subject.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Meir (US Patent6,822,861); Herbst (US Patent 5,457,342); Lee (US Patent 5,676,199) and Sugawara (Japan Patent JP02000305632A).

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael V. Datskovskiy whose telephone number is (571) 272-2040. The examiner can normally be reached on 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren Schuberg can be reached on (571) 272-2044. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Michael V Datskovskiy
Primary Examiner
Art Unit 2835

12/15/2006